

WHAT IS CLAIMED IS:

- 09726880-113000
1. A powder composition comprising at least one fat-soluble vitamin, wherein a vitamin is dispersed in a matrix comprising an emulsion-forming composition selected from the group consisting of a natural polysaccharide gum, a mixture of polysaccharide gums, a protein, a mixture of proteins, and mixtures thereof, wherein the fat-soluble vitamin is present in the powder composition in the form of droplets having an average diameter of about 70 to about 200 nanometers (nm).
 2. A powder composition according to claim 1 wherein the fat-soluble vitamin droplets have an average diameter of about 70 to about 150 nm.
 3. A powder composition according to claim 1 wherein the polysaccharide gum is isolated from the group consisting of plants, animals and microbial sources.
 4. A powder composition according to claim 3 wherein the polysaccharide gum is selected from the group consisting of exudate gums, seaweed gums, seed gums, microbial gums, and mixtures thereof.
 5. A powder composition according to claim 3 wherein the polysaccharide gum is selected from the group consisting of gum arabic, flaxseed gum, ghatti gum, tamarind gum, arabinogalactan, and mixtures thereof.
 6. A powder composition according to claim 5 wherein the polysaccharide gum is gum arabic.
 7. A powder composition according to claim 1 wherein the protein is isolated from a plant or an animal source.
 8. A powder composition according to claim 7 wherein the protein is selected from the group consisting of sunflower proteins, soy-bean proteins, cotton seed proteins, peanut proteins, rape seed proteins, milk proteins, blood proteins, egg

proteins, acetylated derivatives thereof, gelatine, crosslinked gelatine, and mixtures thereof.

5 9. A powder composition according to claim 8 wherein the protein is gelatine.

10 10. A powder composition according to claim 1 wherein the fat-soluble vitamin is selected from the group consisting of vitamin E or its esters, vitamin A or its esters, vitamin K (phytomenadione), vitamin D₃ (cholecalciferol), and mixtures thereof.

11. A powder composition according to claim 10 wherein the fat-soluble vitamin is selected from the group consisting of vitamin E acetate, vitamin A acetate, vitamin A palmitate, and mixtures thereof.

15 12. A powder composition according to claim 1 wherein the ratio of fat-soluble vitamin to matrix component is from about 1:99 to about 3:1.

20 13. A powder composition according to claim 12 wherein the ratio of fat-soluble vitamin to matrix component is from about 1:8 to 1:1.

25 14. A powder composition according to claim 1 wherein the composition comprises from about 15 to about 40% by weight of a fat-soluble vitamin and from about 60 to 85% by weight of a matrix component, based on the total weight of all the components present in the composition.

15. A powder composition according to claim 14 wherein the composition has a moisture content of about 1-4% by weight.

30 16. An emulsion for preparing a powder composition comprising fat-soluble vitamin droplets dispersed in a matrix component, wherein the droplets are about 70 to about 200 nm in diameter.

17. A powder composition according to claim 1, which is formed into a tablet.

18. A beverage comprising a liquid admixed with a powder composition comprising at least one fat-soluble vitamin, wherein a vitamin is dispersed in a matrix comprising an emulsion-forming composition selected from the group consisting of a natural polysaccharide gum, a mixture of polysaccharide gums, a protein, a mixture of proteins, and mixtures thereof, wherein the fat-soluble vitamin is present in the powder composition in the form of droplets having an average diameter of about 70 to about 200 nanometers (nm).

19. A beverage according to claim 18 wherein the beverage has an optical clarity of no more than 20 NTUs when the beverage contains up to 6 mg of the vitamin in 100 g of liquid.

20. A skin care product comprising a powder composition having at least one fat-soluble vitamin, wherein a vitamin is dispersed in a matrix comprising an emulsion-forming composition selected from the group consisting of a natural polysaccharide gum, a mixture of polysaccharide gums, a protein, a mixture of proteins, and mixtures thereof, wherein the fat-soluble vitamin is present in the powder composition in the form of droplets having an average diameter of about 70 to about 200 nanometers (nm).

21. A skin care product according to claim 20, which is selected from the group consisting of balms, lotions, sticks, ointments, make-up compositions, shampoos, conditioners, and nail polishes.

22. A method for producing a powder composition comprising:
(a) combining water with a matrix component for a period of time sufficient for the matrix component to dissolve in the water to form a solution;
(b) adding a fat-soluble vitamin to the solution to form a crude emulsion;

(c) emulsifying the crude emulsion at a temperature of about 5°C to about 75°C at a pressure of about 10,000 psi (about 680 bar) to about 60,000 psi (about 4080 bar), to obtain a vitamin supplement emulsion consisting of droplets with average diameter sizes of 70-200 nm; and

5 (d) drying the emulsion to obtain a powder composition.

23. A method according to claim 22 further comprising mixing the crude emulsion until the size of the droplets within the emulsion is about 1500 nm in diameter or less before the emulsifying step.

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24. A method according to claim 22 wherein the emulsifying step occurs at a pressure of about 25,000 psi (about 1700 bar).

25. A composition to which a powder is admixed to form a product containing a fat soluble vitamin, wherein the powder comprises at least fat-soluble vitamin in the form of droplets of about 70 to 200 nm in diameter, which is dispersed in a matrix comprising an emulsion-forming material selected from the group consisting of a natural polysaccharide gum, a mixture of natural polysaccharide gums, a protein, a mixture of proteins, and a mixture of a polysaccharide gum and a protein.

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26. A composition according to claim 25 wherein the powder is admixed to form a product selected from the group consisting of beverages, beverage concentrates, compositions, and pharmaceuticals.

27. A composition according to claim 25 wherein the powder is in the form of a tablet.

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